REMARKS

This application has been carefully reviewed in light of the Office Action dated April 27, 2009. Claims 1, 3 to 7, 20, 22 to 26 and 39 remain in the application, of which Claims 1, 20 and 39 are independent. Reconsideration and further examination are respectfully requested.

Claims 1, 3, 7, 20, 22, 26 and 39 were rejected under 35 U.S.C. § 103(a) over U.S. Patent No. 5,488,673 (Katayama) in view of U.S. Patent No. 6,330,075 (Ishikawa), and Claims 4 to 6 and 23 to 25 were rejected under 35 U.S.C. § 103(a) over Katayama in view of Ishikawa further in view of U.S. Patent No. 6,977,756 (Nakano). Reconsideration and withdrawal of the rejections are respectfully requested.

The present invention forms bit-connected image data having an integer portion of image data of a target pixel and a decimal portion of image data of a preceding pixel, and then corrected image data is generated. During quantization, the integer portion of the corrected image data is received without receiving the decimal portion so that only the integral portion of corrected image data is quantized. A correction value to be diffused to neighboring pixels is generated, where the correction value to be added is generated from quantized errors of pixels neighboring the target pixel and diffusion components smaller than 1.0 (see, e.g., Figs. 1 and 2).

Referring specifically to the claims, amended independent Claim 1 is directed to an image processing apparatus comprising a bit connection component that connects a decimal portion of image data of a preceding pixel output from a latch component, to image data of a target pixel as lower bits of the image data of the target pixel, and outputs the bit-connected image data of the target pixel, wherein the bit-

connected image data has an integer portion of the image data of the target pixel and the decimal portion of image data of the preceding pixel, a correction component that generates corrected image data of the target pixel by adding a correction value to the bit-connected image data of the target pixel, a latch component that latches a decimal portion of the corrected image data of the target pixel to be connected to image data of a next pixel, without latching an integer portion of the corrected image data of the target pixel, a quantization component that receives an integer portion of the corrected image data without receiving the decimal portion of the corrected image data of the target pixel, and quantizes the received integer portion of the corrected image data of the target pixel, an inverse quantizing component that inverse-quantizes the quantized integer portion of the corrected image data of the target pixel, and outputs an inverse-quantized data of the target pixel, a calculation component that outputs a quantization error of the target pixel based on a difference between the integer portion of the corrected image data of the target pixel and the inverse-quantized data of the target pixel, a buffer that stores the calculated quantization error, and an error diffusion component that generates a correction value by diffusing the quantization error stored in said buffer, wherein the correction value to be added in said correction component is generated by said error diffusion component from the quantization errors of neighboring pixels of the target pixel stored in said buffer and diffusion coefficients being smaller than 1.0.

Claims 20 and 39 are method and computer medium claims, respectively, that substantially correspond to Claim 1.

The applied art, alone or in any permissible combination, is not seen to disclose or to suggest the features of Claims 1, 20 and 39, and in particular, is not seen to

disclose or to suggest at least the features of i) a bit connection component that connects a decimal portion of image data of a preceding pixel output from a latch component, to image data of a target pixel as lower bits of the image data of the target pixel, and outputs the bit-connected image data of the target pixel, wherein the bit-connected image data has an integer portion of the image data of the target pixel and the decimal portion of image data of the preceding pixel, ii) a latch component that latches a decimal portion of the corrected image data of the target pixel to be connected to image data of a next pixel, without latching an integer portion of the corrected image data of the target pixel, iii) a quantization component that receives an integer portion of the corrected image data without receiving the decimal portion of the corrected image data of the target pixel, and quantizes the received integer portion of the corrected image data of the target pixel, and iv) an error diffusion component that generates a correction value by diffusing the quantization error stored in said buffer, wherein the correction value to be added in said correction component is generated by said error diffusion component from the quantization errors of neighboring pixels of the target pixel stored in said buffer and diffusion coefficients being smaller than 1.0.

Katayama is seen to teach an integer calculation performed in the error-to-be-distributed computing means (See Fig. 25). The arithmetic-error computing means 905 calculates arithmetic-error given by the integer calculation of the error-to-be-distributed computing means. The arithmetic-error distributing means distributes the arithmetic-error to adjacent pixels. Thus, Katayama distributes both of the error of integer portion and the arithmetic-error to adjacent pixels. Two types of errors are stored in the error storing means 908. This means that the errors storing means 908

requires the same size of the storing capacity independent on whether or not performing the integer calculation. Katayama is not, however, seen to teach the features of i) a bit connection component that connects a decimal portion of image data of a preceding pixel output from a latch component, to image data of a target pixel as lower bits of the image data of the target pixel, and outputs the bit-connected image data of the target pixel, wherein the bit-connected image data has an integer portion of the image data of the target pixel and the decimal portion of image data of the preceding pixel, ii) a latch component that latches a decimal portion of the corrected image data of the target pixel to be connected to image data of a next pixel, without latching an integer portion of the corrected image data of the target pixel, iii) a quantization component that receives an integer portion of the corrected image data without receiving the decimal portion of the corrected image data of the target pixel, and quantizes the received integer portion of the corrected image data of the target pixel, and iv) an error diffusion component that generates a correction value by diffusing the quantization error stored in said buffer, wherein the correction value to be added in said correction component is generated by said error diffusion component from the quantization errors of neighboring pixels of the target pixel stored in said buffer and diffusion coefficients being smaller than 1.0. Accordingly, Claims 1, 20 and 39 are believed to be allowable over Katayama.

Ishikawa discloses generating a dot pattern directly from a LUT (Look Up Table). An error in the input pixel data is obtained and diffused to surrounding pixels. Ishikawa also implements an inverse quanizer. However, Ishikawa does not teach anything that, when combined with Katayama, would have resulted in the features of i) a bit connection component that connects a decimal portion of image data of a preceding pixel

output from a latch component, to image data of a target pixel as lower bits of the image data of the target pixel, and outputs the bit-connected image data of the target pixel, wherein the bit-connected image data has an integer portion of the image data of the target pixel and the decimal portion of image data of the preceding pixel, ii) a latch component that latches a decimal portion of the corrected image data of the target pixel to be connected to image data of a next pixel, without latching an integer portion of the corrected image data of the target pixel, iii) a quantization component that receives an integer portion of the corrected image data without receiving the decimal portion of the corrected image data of the target pixel, and quantizes the received integer portion of the corrected image data of the target pixel, and iv) an error diffusion component that generates a correction value by diffusing the quantization error stored in said buffer, wherein the correction value to be added in said correction component is generated by said error diffusion component from the quantization errors of neighboring pixels of the target pixel stored in said buffer and diffusion coefficients being smaller than 1.0.

Nakano is not seen to teach anything to overcome the deficiencies of Katayama and Ishikawa. Nakano discloses that a data driven type processing device has an error diffusion computing unit built therein. An error holding register is provided within the error diffusion-computing unit, and is used to successively store and update a value of error information of a pixel that is to be diffused to a neighboring pixel being processed continuously. An error data memory is provided outside the computing unit, and is used to store and update a value of the error information that is to be diffused to another neighboring pixel being processed discontinuously. The error information and the values to be diffused are stored in a packet, and the packet is circulated for operation. However,

Nakano is not seen to disclose or to suggest anything that, when combined with Katayama and/or Ishikawa, would have resulted in at least the features of i) a bit connection component that connects a decimal portion of image data of a preceding pixel output from a latch component, to image data of a target pixel as lower bits of the image data of the target pixel, and outputs the bit-connected image data of the target pixel, wherein the bit-connected image data has an integer portion of the image data of the target pixel and the decimal portion of image data of the preceding pixel, ii) a latch component that latches a decimal portion of the corrected image data of the target pixel to be connected to image data of a next pixel, without latching an integer portion of the corrected image data of the target pixel, iii) a quantization component that receives an integer portion of the corrected image data without receiving the decimal portion of the corrected image data of the target pixel, and quantizes the received integer portion of the corrected image data of the target pixel, and iv) an error diffusion component that generates a correction value by diffusing the quantization error stored in said buffer, wherein the correction value to be added in said correction component is generated by said error diffusion component from the quantization errors of neighboring pixels of the target pixel stored in said buffer and diffusion coefficients being smaller than 1.0.

In view of the foregoing amendments and remarks, amended independent Claims 1, 20 and 39, as well as the claims dependent therefrom, are believed to be allowable.

No other matters having been raised, the entire application is believed to be in condition for allowance and such action is respectfully requested at the Examiner's earliest convenience.

Applicants' undersigned attorney may be reached in our Costa Mesa, California office at (714) 540-8700. All correspondence should continue to be directed to our below-listed address.

Respectfully submitted,

/Edward Kmett/

Edward A. Kmett
Attorney for Applicants
Registration No.: 42,746

FITZPATRICK, CELLA, HARPER & SCINTO
30 Rockefeller Plaza
New York, New York 10112-3800
Facsimile: (212) 218-2200

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